

CHANGE NUMBER: 1708  
PROJECT TITLE: Physical and Chemical Properties of Tobacco  
PROJECT LEADER: B. C. LaRoy  
PERIOD COVERED: August 1-31, 1981  
DATE OF REPORT: September 10, 1981

RELAXATION OF FILLER (L. R. Trentham and B. C. LaRoy)

Additional stress relaxation measurements of filler with normal and WS flavors are in progress. Initial observations confirm our earlier conclusion that WS treated filler has a higher short-term modulus than the normal material. However, sample-to-sample variations are large and more data are needed to quantitate the effect.

PROPYLENE GLYCOL<sup>1</sup> (J. C. Crump)

In the interest of understanding observed losses in weight of tobacco samples sprayed with propylene glycol, samples of tobacco sprayed with different concentrations of PG and pure PG samples are being monitored under different conditions of relative humidity. Initial results indicate that after thirty days, PG placed in the laboratory atmosphere or in an Aminco chamber has continued to lose weight. The chamber and room are at equilibrium and the PG vaporizes. However, when placed in a sealed chamber with an NaBr salt solution used to maintain a 58% relative humidity, the PG has gained weight during the thirty days. The PG is evidently picking up excess moisture from the system, water being more mobile than PG, and it is expected that a moisture equilibrium will eventually be reached after which the transfer of water molecules will cease and the NaBr solution will likely sorb PG, causing a weight loss in the PG solution.

VIBRATION TESTING OF CIGARETTES<sup>2</sup> (D. A. Full)

Tests of monitor cigarettes at a frequency of 100 Hz and a test duration of 17 min. were reported last month. This work has been extended to frequencies of 50 Hz and 200 Hz, accelerations from 16G to 91G, and to times from 15 sec. to ~3 hrs, with the following results:

1. At a fixed frequency and amplitude (fixed acceleration) weight loss,  $\Delta W$ , as a function of time,  $t$ , can be represented by

$$\Delta W = At^B$$

where A and B are constants.

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2. If frequency and amplitude are varied between tests in such a way as to produce the same acceleration, then the parameter B above decreases with increasing frequency (decreasing amplitude).

The diminished sensitivity to duration at the higher frequencies was unexpected. It may be related to the fact that the wrap paper is not perfectly cylindrical, but has numerous local depressions with dimensions which are comparable to the amplitude of vibration. The disintegration of the filler rod is often observed to involve sliding as a monolith, within the wrap paper, in an incremental fashion. The size of these increments must be comparable to the amplitude of vibration, which is smaller at higher frequency, for a specified acceleration. If these do not exceed the characteristic dimensions of the depressions in the wrap paper, the likelihood is greater that successive incremental sliding motions will be simply back and forth rather than a "random walk."

#### WAREHOUSE CONDITIONS (B. C. LaRoy, J. C. Crump, M. J. Wood)

Monitoring of temperature and humidity in Cabarrus County and Richmond warehouses has continued. Malfunctions in instrumentation used to read the strip chart records has necessitated reanalysis of some of the data. An initial report is in preparation. Eight additional temperature/humidity recorders were received and calibrated.

On August 28, 1981, four hogsheads of bright (two grades) and two of burley (one grade) were opened and inspected in Cabarrus warehouse #6. No visible mold was seen and the tobacco seems in good condition.

#### RL-MOLD STUDY<sup>3,4</sup> (J. C. Crump)

Samples of RL with various cooked flavor, PG and sorbate contents as supplied by L. Wu have been stored at 75°F and humidities ranging from 58% to 80% RH. The 75°F moisture isotherm was determined for each sample and the samples are checked regularly for mold. After 70 days, no macroscopic mold has been observed on any of the samples.

#### COMPUTER MODELING APPLICATIONS (H. A. Hartung, M. J. Wood)

Programs were written to interface APL modeling applications with new graphics capabilities on the DEC computer. We are now attempting to organize a special interest group (SIG) to coordinate the checking, debugging, documenting and training that necessarily goes with new computer applications.

At Westab we have been working on two applications of the IBM 5120 computer. One is the mass balance program and it was completed in August. All data on production, by-products, waste and inventory changes are stored in files on diskettes. The data are used to provide weekly and monthly summaries of yields and accountability. The second project at Westab is updating the system that tracks Q.A. and process data. This is scheduled for implementation in October. Records of about 60 parameters will be retained on diskettes on a shift-by-shift basis. Ten separate daily, weekly,

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and quarterly reports will be generated from these files. Historical files will also be kept on the 5120 and Westab will be freed from its current dependence on the old Sigma computer at R&D. The diskette files will be formatted so that they can be transmitted to the DEC computer for math modeling work.

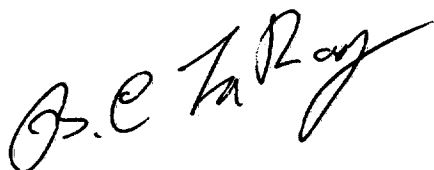
SEMINARS (B. C. LaRoy and D. A. Full)

A series of three internal seminars was presented on the mechanical properties of viscous materials and tobacco. These were well received and provided the bases for numerous inter-project and divisional discussions.

REFERENCES

1. J. C. Crump, Notebook #7220, p. 139
2. D. A. Full, Notebook #7199
3. J. C. Crump, Notebook #7220, p. 139
4. J. C. Crump, RL-Mold Study, memo to L. Wu, Sept. 9, 1981
5. H. A. Hartung, et al, APL/Graphics "SIG", memo to distribution, August 24, 1981

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